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atmospheric air. But such cannot be the case; for if seeds be made to germinate in the lower stratum of earth placed in a box furnished with holes in the bottom, the roots will descend into the air through those holes, while the stems will ascend into the earth. In a similar manner, it might and has been thought that roots are attracted, and stems repelled, by the moisture of the earth; but a seed made to germinate between two moist sponges will protrude its root downwards, and its stem upwards, without reference to the liquid in its vicinity. This explanation is therefore equally inadmissible. There are some who explain these, as well as all other things occurring in living beings, by the mysterious principle of life; but we only admit the existence of this principle, because there are some phenomena incapable of being accounted for by the ordinary laws that rule the universe, and that are common to all matter; and it is therefore unphilosophical to ascribe any effects to its operation, until they are found to be inexplicable by those ordinary laws. But we shall find that the facts in question do not in a great measure belong to these exceptions.

The particular directions of stems and roots are produced by a combination of causes: if an onion plant, exposed to daylight, be laid horizontally on the ground, the extremities of the stem and roots will in the course of a few hours turn themselves in their natural directions, the one upwards, and the other downwards; if a similar plant be placed in a dark cellar, to which no light has access, the same things will take place; but that which happens in a few hours, in the one instance, will require as many days in the other; and thus we learn that in the production of these effects two causes operate: first, the light; and, secondly, some other principle distinct from light. It will occur to the reader that the absorption of water from the earth, by the most depending part of the plant, and its evaporation above, might, by swelling the lower portion and contracting the upper, produce the upward curving of the stem; to obviate this objection, the plant was placed in water, where no evaporation could occur, and absorption must take place equally over the whole surface; and still it was found that the same things happened.

Light, therefore, is most powerfully influential in producing the particular directions of the parts of plants; but there is another principle, distinct from light, which acts in effecting the same phenomena in a minor degree, but not the less absolutely and even more generally. Let our readers bear in mind the existence of this principle, which will form the subject of a future article. For the present, we will examine the manner in which light operates in promoting the directions of stems and roots.

We have before hinted that the tendency of the organs of vegetables towards the light, bears a direct relation to the depth and brilliancy of their colours; roots which are usually destitute of colouring matter grow away from the light; the upper surfaces of leaves are always the most deeply coloured; and in those erect leaves which are equally exposed to light, both surfaces are similarly coloured; if the outer surface of a flower be richly tinted, it is pendent; in erect flowers, on the contrary, the internal surface is always the most brilliantly painted; and in some cases the direction of the flower and fruit is different, connected with similar conditions. But in all these instances we have reason to believe that the organ is not directed towards the light, because it is highly coloured; but that it is highly coloured, because it is presented to the light. In plants growing in the dark, all the organs are colourless; it is only when exposed to the light that they acquire their various hues. Even the extremities of the roots have been found in a singular experiment of Dutrochet's to acquire a green colour by exposure to the influence of light.

Is this tendency of the coloured parts of plants to turn towards the light, due to an attraction exerted by this agent, or is it produced by a peculiarity of growth determined through its influence? A curious experiment has settled this question: A leaf, attached by its footstalk to a pivot, was so arranged that it could freely turn in every direction: under these circumstances, its under surface was exposed to light. If an attraction existed between the most deeply coloured portion and the light, the leaf might be expected to revolve on its pivot, in obedience to this attraction: but instead, the footstalk took on a spiral or corkscrew growth, by means of which the upper portion became in time presented to the light. Now, this experiment sufficiently showed that the manner in which light acts, is by its influence over vegetable growth.

But what is the influence of light over vegetable growth? We have already answered this question in our articles on

the Sap: we have found that when light is present, the sap becomes elaborated in the green parts of plants; and the use of this elaborated sap is, by developing vegetable fibre, to increase the thickness of stems, and the length of roots. While the ascending sap, by forming vegetable flesh, lengthens the stems, and makes the root thick, the directions of the different parts of plants, by the agency of light, must be in obedience to these functions.

We are now in a condition to comprehend the cause of some phenomena. A geranium (*Pelargonium*) stem, placed at a window, curves towards the light: this takes place, because the portion of stem nearest the window elaborates most sap: consequently, in this portion most vegetable fibre is formed. The portion away from the light, on the contrary, has most ascending sap, which forms fleshy tissue, and lengthens the stem; the half of the stem remote from the light is therefore longer, than the half nearest the light; the former is fleshy and elastic, the latter is rigid and fibrous. Need we be surprised, then, that the short, rigid, and fibrous portion should draw down the long, fleshy, and elastic part, and curve it towards the light?—it is but the bending of a bow, by the agency of its string.

But why do roots curve away from the light? Neither is this difficult to understand. Roots do not elaborate the sap, nor form vegetable fibre of their own: what vegetable fibre they contain is pushed down through them from the stem: more of this vegetable fibre will force its way downwards, from the part of the stem nearest the light, than from that which is most remote: two forces of unequal intensity will push downwards, through opposite portions of the root; the greater pressure may be expected to overcome the lesser, and in obedience to this, the root will curve away from the light.

We have now endeavoured to demonstrate the manner in which light operates in causing the directions of stems and roots: but it will be recollected that there is another principle, less powerful but more universal, which shares in the production of these effects. The consideration of this will form the subject of our next article. J. A.

CAROLAN THE HARPER.—Respecting the origin of Carolan's fine air of "Bumper Squire Jones," we have heard a different account from that given on O'Neill's authority. It was told us by our lamented friend, the late Dean of St Patrick's, as the tradition preserved in his family, and was to the following effect: Carolan and Baron Dawson, the grand or great grand-uncle of the dean, happened to be enjoying together, with others, the hospitalities of Squire Jones at Mooneyglass, and slept in rooms adjacent to each other. The bard, being called upon by the company to compose a song or tune in honour of their host, undertook to comply with their request, and on retiring to his apartment, took his harp with him, and under the inspiration of copious libations of his favourite liquor, not only produced the melody now known as "Bumper Squire Jones," but also very indifferent English words to it. While the bard was thus employed, however, the judge was not idle. Being possessed of a fine musical ear as well as of considerable poetical talents, he not only fixed the melody on his memory, but actually wrote the noble song now incorporated with it before he retired to rest. The result may be anticipated. At breakfast on the following morning, when Carolan sang and played his composition, Baron Dawson, to the astonishment of all present, and of the bard in particular, stoutly denied the claim of Carolan to the melody, charged him with audacious piracy, both musical and poetical, and, to prove the fact, sang the melody to his own words amidst the joyous shouts of approbation of all his hearers,—the enraged bard excepted, who vented his execrations on the judge in curses both loud and deep.—*Dublin University Magazine.*

The two most precious things on this side the grave are our reputation and our life. But it is to be lamented, that the most contemptible whisper may deprive us of the one, and the weakest weapon of the other. A wise man, therefore, will be more anxious to deserve a fair name than to possess it, and this will teach him so to live as not to be afraid to die.—*Colton.*

Printed and published every Saturday by GUNN and CAMERON, at the Office of the General Advertiser, No. 6, Church Lane, College Green, Dublin.—Sold by all Booksellers.